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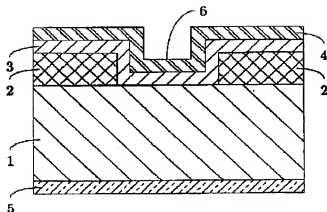
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INVENTOR : IKEDA JUNJI;

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TITLE : THIN-FILM COLD CATHODE AND ITS  
MANUFACTURE



ABSTRACT : PROBLEM TO BE SOLVED: To manufacture an insulator for element separation high in insulation withstand voltage without impairing the characteristics of an intrinsic semiconductor in the process of manufacture.

SOLUTION: In this thin-film cold cathode, when a voltage is placed between a thin-film electrode 4 and a back electrode 5 so as to positively polarize the thin-film electrode 4, electrons in a conduction band of an n-type Si-semiconductor substrate 1 are injected into a conduction band of an intrinsic semiconductor 3. Because the intrinsic semiconductor 3 is highly resistive, a voltage drop is produced in the intrinsic semiconductor 3 to set up a strong electric field. The electrons injected from the n-type Si-semiconductor substrate 1 are accelerated by the strong electric field, and thus electrons having energy exceeding the work function of the thin-film electrode 4 are emitted into a vacuum. In manufacturing this thin-film cold cathode, the formation of a field oxide film 2 acting as an insulator for element separation is performed prior to that of the intrinsic semiconductor 3, and therefore the intrinsic semiconductor 3 can be prevented from being damaged while the insulator for element separation is formed.

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